

Action Memorandum
for
BEAL MOUNTAIN MINE
NON TIME-CRITICAL REMOVAL

Beaverhead-Deerlodge National Forest
Silver Bow County, Montana

MAY 14, 2010

I. PURPOSE

The USDA Forest Service will conduct response actions at the Beal Mountain Mine Site located in Silver Bow County, Montana, through the agency's delegated authority (Executive Order 12580) under the Comprehensive, Environmental, Response, Compensation, and Liability Act (CERCLA). All response actions will be consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300)(NCP). The purpose of this Action Memorandum is to request approval and document the rationale for the selected non-time critical removal action, as authorized by section 104 (42 U.S.C. 9604) of CERCLA, at the Beal Mountain Mine Site (Site). Copies of the Administrative Record for this project are available for viewing at the Butte Ranger District, Butte, Montana. Public review of the record can be conducted during regular business hours. The Regional Forester has designated Mary Beth Marks, as the On-Scene-Coordinator for this action consistent with 40 CFR 300.415 (m).

A release, or a significant threat of a release, has or is occurring at the Site that poses a threat to public health or welfare or the environment, on and /or from lands under the jurisdiction, custody, or control of the USDA Forest Service, Beaverhead-Deerlodge National Forest. Conditions at the Site may present an imminent and substantial endangerment to human health or welfare and the environment, on and/or from lands under the jurisdiction, custody, or control of the USDA Forest Service, Beaverhead-Deerlodge National Forest. These conditions meet the criteria for initiating a Removal Action under 40 CFR Section 300.415 (b)(2) of the National Contingency Plan (NCP). Executive Order 12580 and 7 CFR 2.60(a)(39) delegates Removal Action authority to the USDA Forest Service, when the source of the release or potential release of hazardous substances is on or from National Forest System (NFS) lands.

The scope of this proposed action is to control and contain the release of and exposure to specific contaminants that are impacting human health and the environment at the Site. The proposed action set forth in this Action Memorandum is consistent with the Final Engineering Evaluation/Cost Analysis (EE/CA) that was prepared for the Forest Service by its consultant Tetra Tech. The EE/CA developed various response action alternatives that address impacts associated with hazardous substances present at the Site. The Final EE/CA provides the details and basis for the selected response action for features at the Site. The following discussion substantiates the need for a removal response, identifies the proposed action, provides the specific risk reduction criteria under which the proposed action will be conducted, demonstrates that these criteria are protective of human health and the environment, and explains the rationale for the Forest Service's selection of the proposed response action.

The proposed response action will be executed by following the non-time critical removal action process as defined by CERCLA and the NCP. Response actions as explained in the US Environmental Protection Agency's (EPA) *Guidance on Conducting Non-Time Critical Removal Actions Under CERCLA* are implemented for "the cleanup or removal of released hazardous substances from the environment ... as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment..." (EPA, 1993).

CERCLA actions at the Site will include the participation of the Technical Working Group. The Technical Working Group now consists of representatives from the Clark Fork Coalition, Trout

Unlimited, the Forest Service, the Montana Department of Environmental Quality, and Montana Bureau of Mines and Geology. The purpose of the Technical Working Group is to provide for an organized, structured protocol for technical input and comments on Forest Service decisions regarding CERCLA response actions at the Site.

II. SITE CONDITIONS AND BACKGROUND

A. Site Description

1. Removal Site Evaluation

The Beal Mountain Mine, an open pit gold mine with cyanide heap leach and waste rock facilities, is located in the headwaters of German Gulch in the Pioneer Mountains, Silver Bow County, Montana (**Figure 1**), about 16 miles west southwest of Butte and 10 miles southwest of Fairmont (Gregson) Hot Springs. The mine is situated on land managed by the United States Department of Agriculture, Forest Service (FS), Beaverhead-Deerlodge National Forest (BDNF) (**Figure 2**).

Beal Mountain Mining, Inc. (BMMI) operated the mine from 1988-1998 under a Forest Service approved operating plan and a State approved operating permit. The mine and BMMI were owned by Pegasus Gold Corporation (PGC) until 1998 when PGC declared bankruptcy. In 1998, a Federal bankruptcy court appointed a Trustee to liquidate the assets for the creditors. In 1999, the insurance company (Safeco) released the reclamation bond to the State. As part of the surety bond agreement, the Trustee was responsible for completing reclamation and closure work to be paid for with bond funds.

The mine reclamation plan approved for closure called for neutralization of the cyanide solution from the leach pad with hydrogen peroxide and then applying the treated solution to the surrounding land through drip irrigation. Over the course of solution treatment in 1999 (after the Pegasus bankruptcy), the agencies found that test applications of treated solution were killing vegetation. Further studies found this was due to the unexpected presence of a chemical byproduct of cyanide neutralization called thiocyanate. The agencies determined that in order to treat for thiocyanate, it was necessary to construct, and operate a bio-treatment plant. The biological water treatment facility was operated from 2001 to 2003 by Beal Mountain Mine, Inc and again in 2005 by the FS. These unexpected water treatment costs, combined with capping of the leach pad with a geotextile cover in 2002 and 2003, and rapidly increasing energy costs, resulted in reclamation costs which far exceed the \$6.5 million reclamation and closure bond for the Beal Mountain Mine site.

With a filing of bankruptcy in 1998 and exhaustion of bonding funds to complete reclamation, the FS, in cooperation with the Montana Department of Environmental Quality (MDEQ), became the lead agency responsible for final mine closure. As the land management agency, the FS placed the mine site under its CERCLA authority, and determined that the non-time-critical removal action process would be followed for mine closure. As part of that process, the FS contracted with Maxim Technologies (Maxim was acquired by Tetra Tech in 2005) to develop an Engineering Evaluation/Cost Analysis (EE/CA) that would evaluate final closure options for the Beal Mountain Mine.

On December 10, 2002, Clark Fork Coalition filed separate lawsuits against the Forest Service and the State of Montana. Through negotiations, the Forest Service and Clark Fork Coalition entered into a settlement agreement. A key part of the settlement agreement was the formation of a Technical Working Group that initially included delegates from the Clark Fork Coalition, Montana DEQ, and Beal Mountain Mining, Inc. The Forest Service is currently managing the Site with technical input from the Technical Working Group.

In 2004, FS contracted with Maxim Technologies (Maxim) to prepare a report documenting the existing conditions at the Beal Mountain Mine Site (Maxim, 2004a). That report describes in some detail the geology, hydrology, water quality, aquatics, and fisheries conditions at and near the mine. The *Existing Conditions Report* also characterizes the source, nature, and extent of contamination and the risks of potential contaminant release related to various mine facilities at the Beal Mountain Mine. Subsequently, an agency revised draft of the original EE/CA was prepared and released in September of 2005 (Maxim 2005). In February of 2009, the USDA-FS contracted with Tetra Tech, Inc. (Tetra Tech) (who in the interim had acquired Maxim Technologies, Inc.) to revise and update the 2005 Draft EE/CA to a final document. The Final EE/CA dated March 2010, includes a description of activities that have taken place and summarizes additional data collected at the Beal Mountain Mine site since 2005, develops and analyzes removal alternatives, and selects preferred removal action alternatives for each mine facility that are the basis for response action at the Site.

In 2006, a pilot scale Reverse Osmosis (RO) water treatment plant was designed, installed, and tested by Tetra Tech for the FS. In 2008, a full scale RO water treatment facility was constructed and operated at the site to remove, treat and dispose of excess water accumulating in the heap leach pad. A total of 37.4 million gallons of water were treated in 2008 and 2009. Water infiltrating into the heap leach pad will require seasonal treatment and discharge on an annual basis until source control measures are implemented that reduce or eliminate excess water accumulation in the leach pad.

2. Physical location

The Beal Mountain Mine is located approximately 15 miles west of Butte, Montana in Sections 5 and 6, T2N, R10W and Sections 31 and 32, T3N, R10W of the Montana Principle Meridian (Attachment 1). The Beal Mountain Mine occurs within the German Gulch watershed. German Gulch has two main tributaries, Beefstraight Creek and Norton Creek; Minnesota Gulch is a tributary of Beefstraight Creek. Further downstream German Gulch becomes a tributary to Silver Bow Creek, which in turn becomes a tributary to the Upper Clark Fork River. German Gulch is a 26,275-acre watershed with elevations ranging from approximately 5,300 feet at its mouth to 8,909 feet on its western divide with Minnesota Gulch. Annual precipitation in the vicinity of the site is approximately 25 inches, most of which occurs as snowfall from October through April. Stream flows range from more than 500 cubic feet per second during spring peak run-off, to less than 10 cubic feet per second during summer base flow.

3. Site characteristics

The Beal Mountain Mine occupies approximately 450 acres and includes two mine pits, a 77-acre heap leach facility, a 48-acre waste rock dump, and an ore-processing building currently housing the

Reverse Osmosis water treatment plant (Attachments 1 and 2). All of the mine facilities are on National Forest System (NFS) lands. See Attachment 2 for a map showing the Beal Mountain Mine area.

4. Release or threatened release into the environment of a hazardous substance, pollutant, or contaminant

a. Hazardous Substances

Site characterization, including extensive sampling, has revealed that hazardous substances, as defined in section 101 (14) of CERCLA, 42 U.S.C. 9601(14), have been released into the environment. This includes the release or threat of a release of total recoverable nitrate+nitrite, sulfate, copper, iron, selenium and cyanide.

b. Sampling and Analysis Data

The FS continues to monitor water quality at the Site. Past monitoring has included surface and groundwater quality monitoring, macroinvertebrate monitoring, and analysis of fish and aquatic macroinvertebrate tissues for selenium and copper.

Ongoing surface water quality monitoring occurs at several surface water sites in the German Gulch watershed, including Beefstraight Creek and Minnesota Gulch. Monitoring of the heap leach solutions, the RO treatment plant effluent and waste rock seepage is also occurring. Figure 7 of the March 2010 EE/CA shows the locations of the surface water monitoring stations.

Total recoverable selenium concentration measured in surface water during the period from 2003 to 2009 are shown in Table 3-5 of the March 2010 EE/CA in German Gulch. STA-4 and all stations downstream of STA-3A are below the chronic aquatic life standard for selenium of 0.005 mg/L. Concentrations of selenium measured in all of the surface water samples collected during the 2003 to 2009 period from STA-3 and STA-3A exceeded the chronic aquatic life standard, but none exceeded the acute aquatic life standard of 0.02 mg/L. Selenium concentrations measured in surface water samples from stations STA-4, STA-3, and STA-3A reached their highest levels between 1997 and 1999 and have generally declined since then.

Sampling of groundwater quality from monitoring wells was conducted between 2001 and 2005. Monitoring of groundwater springs and seeps has occurred from 2003 to the present. Figure 18 of the March 2010 EE/CA shows the locations of the groundwater monitoring stations. Review of this data indicates that samples from wells only rarely exceeded groundwater standards for arsenic, nitrate, iron and cyanide. Since Land Application Disposal (LAD) of heap leach solutions at the site began in 2001, cyanide concentrations in one monitoring well in the LAD area exceeded groundwater human health standards. Select springs in these areas as well as in other areas down-gradient of the heap leach facility have also exceeded the standards for selenium and cyanide.

As part of the aquatic monitoring plan, fish and aquatic macroinvertebrate tissues were collected and analyzed for selenium and copper concentrations. Mean selenium concentration in macroinvertebrates found in the middle reach of German Gulch was above a range of suggested

toxic effects thresholds (guidelines) to various fish from dietary organisms of 3 to 11 $\mu\text{g/g}$ summarized in published studies. Selenium was found to be elevated in fish whole-body tissues from middle German Gulch at a mean dry-weight concentration of 10.8 $\mu\text{g/g}$, while levels did not appear to be elevated in Minnesota Gulch (mean concentration of 2.51 $\mu\text{g/g}$) and Beefstraight Creek (mean concentration of 3.53 $\mu\text{g/g}$). Recommended toxic effects thresholds (guidelines) for fish whole-body dry-weight selenium concentrations generally range from 4 to 6 $\mu\text{g/g}$. Copper concentrations did not appear to be elevated in macroinvertebrates or fish. However, selenium concentrations in Beefstraight Creek invertebrates (7.06 $\mu\text{g/g}$) were higher than the range of 0.4 to 4.5 $\mu\text{g/g}$ described as background levels in aquatic invertebrates. Dietary levels of greater than 3 $\mu\text{g/g}$ of selenium may reduce survival of juvenile salmonids.

c. Mechanism for Past, Present, or Future Release

The past release of hazardous substances from the leach pad occurred in 1999 with the rise of solution levels on the leach pad to the point of over-topping the embankment. The direct discharge from the pad was estimated at as much as 170,000 gallons of contaminated pad solution. With the 2001 construction and operation (2001-2003 and 2005) of the biological water treatment system heap leach solutions were reduced to minimize the risk of overtopping of the embankment. However, an effluent with cyanide, selenium and copper in excess of standards was applied to the ground in a Land Application Discharge (LAD) system through a drip irrigation and spray system at a rate between 120 and 150 gpm. Effluent then infiltrated into the subsurface where it mixed with groundwater and slowly migrated down-gradient to the streams.

Leach pad geochemical data indicates changing chemistry of the heap leach pad solution principally by dilution with infiltrating precipitation and groundwater that enters the leach pad along an incomplete cover along at least the northern margin of the pad. Present or future releases from the heap leach facility by direct discharge are not expected, because RO water treatment and disposal of treated solutions is ongoing to manage solutions levels on the heap leach pad.

Past and present releases of hazardous materials, principally selenium as seepage from the waste rock dump to surface water springs and to groundwater occur in the toe area of the dump and releases to groundwater also occur from the backfilled Main Beal Pit. This seepage is induced principally by infiltration of precipitation or lateral flow of groundwater into mine waste materials.

d. Events or Features that could Spread or Accelerate Releases

High volume rain events and spring runoff could affect the level of solution in the heap and cause the pad to accumulate more solution than from a typical precipitation season. In addition, groundwater may be entering the leach pad along its northern perimeter boundary. If too much water enters the pad and the solution level exceeds the 7504.5 foot elevation, there could be a release of pad solution to surface or groundwater.

e. Properties that influence the Rate of Releases

The RO plant was designed to treat approximately 200 gpm of heap leach solution. This system is limited in the volume of solution it can treat and therefore, effluent rates of treated water to either

LAD systems or by direct discharge are not expected to change. Operation of the RO system will continue seasonally until either the inflow to the pad is minimized or another system is constructed to replace this system.

5. National Priority List (NPL Status)

The Beal Mountain Mine is not on the National Priorities List and is not expected to be placed on the list in the future.

6. Maps and Graphic Representation

A topographic location map is attached (see Attachment 1 – Vicinity Map). A Site Map showing mine facilities and features is also attached at the end of this report (see Attachment 2 – Site Map).

B. Other Action to Date

1. Previous Actions

An Action Memo was signed in July 2003. The proposed action was to examine response action alternatives to the biological water treatment system, LAD system and interim measures to treat seepage from the waste rock dump. The Forest Service operated the biological treatment plant to treat excess pad solution, and pumped treated pad solution and collected waste rock dump seepage to various LAD disposal areas in 2005.

In 2006, a pilot scale Reverse Osmosis (RO) water treatment plant was designed, installed, and tested by Tetra Tech for the FS. In 2008, a full scale RO water treatment facility was constructed and operated at the site to remove, treat and dispose of excess water accumulating in the heap leach pad. A total of 37.4 million gallons of water were treated in 2008 and 2009.

2. Current Actions

Water entering the heap leach pad will require seasonal treatment and disposal on an annual (seasonal) basis until source control measures are implemented that reduce or eliminate excess water accumulation on the leach pad. The existing RO plant will continue to be operated until either the inflow to the pad is minimized or another water treatment system is constructed to replace the RO system

C. State and Local Authorities' Role

1. State and Local Actions to Date

The Forest Service and MDEQ continue to cooperate on the management, characterization, reclamation and closure of the Site.

2. Potential for Continued State/Local Response

The Forest Service will take the lead in evaluating the Site and will continue cooperating with MDEQ in the removal of the contaminants of concern and hazardous substances. In implementing this CERCLA removal action, the Forest Service will conduct community relations activities as described in the NCP and 40 CFR 300. As a component of the community relations effort, a Technical Working Group (Group) has been organized for the Site. The purpose of this group is to provide for an organized, structured format for technical input and comment on Forest Service decisions under CERCLA with respect to management and closure of the Site. The settlement agreement between the Clark Fork Coalition and the Forest Service defines the function and membership of the Group. The Forest Service met most recently with the Group on April 8, 2010 and discussed the Final EE/CA and the proposed activities at the Site for the 2010 field season.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

A. Threats to Public Health or Welfare

The EE/CA demonstrates a threat to public health or welfare, or to the environment as set forth in the NCP at 40 CFR 300.415 (b)(2). In summary, this threat is the risk associated with the stability of the heap leach facility and the accumulation of excess water on the leach pad such that there is a potential for contaminants to be released into the environment if a failure of the leach pad embankment or overtopping of the leach pad embankment were to occur. Additionally, seepage from the waste rock dump is contributing contaminants into the environment. These conditions meet the criteria for initiating a Removal Action under 40 CFR Section 300.415 (b)(2) of the NCP.

The potential threat of direct exposure exists through the inhalation and ingestion of cyanide and selenium that may expose human and animal populations to the toxic effects from cyanide and selenium exposure. The following factors from § 300.415 (b)(2) of the NCP form the basis for our determination of the threat presented, and the appropriate action to be taken:

- (i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;
- (ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems;
- (iii) High levels of hazardous substances, pollutants, or contaminants in soils largely at or near the surface, that may migrate;
- (iv) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released; and,
- (v) The unavailability of other appropriate federal or state response mechanisms to respond to the release.

The toxicity profiles for human and animal exposure to cyanide and selenium outlined below are from a web site located at <http://risk.lsd.ornl.gov/tox/profiles/>.

Cyanide

Cyanide most commonly occurs as hydrogen cyanide and its salts--sodium and potassium cyanide. Cyanides are both synthetic and naturally occurring substances. They are found in several plant species as cyanogenic glycosides and are produced by certain bacteria, fungi, and algae. In very small amounts, cyanide is a necessary requirement in the human diet. Cyanides are released to the environment from industrial sources and car emissions.

The inhalation, oral, and dermal routes of exposure readily absorb cyanides. The central nervous system is the primary target organ for cyanide toxicity. Neurotoxicity has been observed in humans and animals following ingestion and inhalation of cyanides. Cardiac and respiratory effects have also been reported. Short-term exposure to high concentrations produces almost immediate collapse, respiratory arrest, and death. Symptoms resulting from occupational exposure to lower concentrations include breathing difficulties, nervousness, vertigo, headache, nausea, vomiting, and electrocardiogram abnormalities. Thyroid toxicity has been observed in humans and animals following oral and inhalation exposure to cyanides.

Selenium

Selenium is an essential trace element important in many biochemical and physiological processes. Recommended human dietary allowances (average daily intake) for selenium are as follows: infants up to 1 year, 10-15 µg; children 1-10 years, 20-30 µg; adult males 11-51+ years, 40-70 µg; adult females 11-51+ years, 45-55 µg; pregnant or lactating women, 65-75 µg.

There appears to be a relatively narrow range between levels of selenium intake resulting in deficiency and those causing toxicity.

Selenium occurs in several valence states. Toxicity of selenium varies with valence state and water solubility of the compound in which it occurs. In humans, acute oral exposures can result in excessive salivation, garlic odor to the breath, shallow breathing, diarrhea, pulmonary edema, and death. Other reported signs and symptoms of acute selenosis include tachycardia, nausea, vomiting, abdominal pain, abnormal liver function, muscle aches and pains, irritability, chills, and tremors. General signs and symptoms of chronic selenosis in humans include loss of hair and nails, clubbing of the fingers, skin lesions, tooth decay, and nervous system abnormalities.

In humans, inhalation of selenium or selenium compounds primarily affects the respiratory system. Dusts of elemental selenium and selenium dioxide can cause irritation of the skin and mucous membranes of the nose and throat, coughing, nosebleed, loss of sense of smell, bronchial spasms, bronchitis, and chemical pneumonia. Information on toxicity of selenium in humans and animals following chronic inhalation exposures is not available, and sub-chronic and chronic inhalation Reference Concentrations have not been derived. In studies on laboratory animals, selenites or selenates have not been found to be carcinogenic.

B. Threats to the Environment

Two groups of ecological receptors have been identified as potentially being affected by contamination associated with the Site. The first group includes aquatic life associated with segments of streams located down-gradient of the Site. The second group of receptors is native

terrestrial plants at the Site whose ability to grow in soil affected by the mine waste may be limited by relatively high concentrations of certain metals and salts.

The German Gulch watershed is an important ecological resource for cold-water fish and aquatic life. All these streams support populations of native westslope cutthroat trout, a species recognized as "sensitive" by the USDA Forest Service, and non-native eastern brook trout. Release of hazardous substances at the Beal Mountain Mine has resulted in elevated total cyanide, selenium, and historically copper concentrations that have periodically exceed State of Montana acute and/or chronic aquatic-life standards in area surface water and groundwater. However, the stream systems have not lost their ability to support a sustainable fishery.

Wildlife and cattle that graze in the area may be exposed to on-site contamination either through direct contact with contaminated soil, plant forage, standing water, and sediments, or indirectly through consumption of organisms (algae, aquatic insects, or animals) feeding in the area.

Cyanide, selenium, and copper are found on-site in elevated levels, are hazardous substances as defined in the CERCLA, Section 101(14), and are listed in 40 CFR Section 302.4 "List of Hazardous Substances and Reportable Quantities".

Cyanide

Cyanide toxicity is caused by the free cyanides (HCN and CN-) by suppressing aerobic respiration. Fish are the most susceptible organisms - sensitive species exhibit chronic effects at as low as 5-7 ppb. The toxicity of complex cyanides is usually, but not always, low, but the degradation products often include free cyanides that are toxic. Free cyanides readily degrade in environments exposed to atmospheric oxygen and sunlight but persist in groundwater. They do not bioaccumulate. Sub-lethal effects in fish include reduced reproductive capacity (decreased egg number and viability, and reduced embryo and larval survival), impaired swimming ability, and altered growth. Free cyanides are phytotoxic at higher concentrations than those associated with adverse effects in fish. Mammals are less sensitive than fish, and are relatively tolerant of intermittent sub-lethal exposures.

Selenium

Selenium undergoes bioconcentration, bioaccumulation, and biomagnification as trophic levels increase. It can enter the food web through both sediments and surface water. Elevated levels cause growth reduction in green algae. In other aquatic organisms, the following adverse effects have been observed: loss of equilibrium and other neurological disorders, liver damage, reproductive failure, reduced growth, reduced movement rate, and chromosomal aberrations.

In domesticated animals, sub-chronic and chronic oral exposures can result in loss of hair, malformed hooves, and nervous system abnormalities. Damage to the liver and kidneys and impaired immune responses have been reported to occur in rodents following sub-chronic and/or chronic oral exposures.

Selenium is teratogenic in birds and possibly also in domesticated animals (pigs, sheep, and cattle), but evidence of teratogenicity in humans and laboratory animals is lacking. However, adverse reproductive and developmental effects have been reported for domesticated and laboratory animals.

Acute toxic effects observed in animals include pulmonary congestion, hemorrhages and edema, convulsions, altered blood chemistry; liver congestion; and congestion and hemorrhage of the kidneys. In animals, acute inhalation exposures also result in severe respiratory effects including edema and hemorrhage as well as in spleen damage and liver congestion and mild central atrophy.

Copper

Copper is highly toxic in aquatic environments and has effects in fish, invertebrates, and amphibians. Copper is highly toxic to amphibians, with adverse effects in tadpoles and embryos, and mortality. Copper will bio-concentrate in many different organs in fish and mollusks. Toxic effects in birds include reduced growth rates, lowered egg production, and developmental abnormalities. Toxicity in mammals includes a wide range of animals and effects such as liver cirrhosis, necrosis in kidneys and the brain, gastrointestinal distress, lesions, and low blood pressure.

Copper is a micronutrient and toxin. It strongly adsorbs to organic matter, carbonates, and clay, which reduces its bioavailability. There is a moderate potential for bioaccumulation in plants, low potential for bio-concentration by fish, and no bio-magnification. Fish, invertebrates and aquatic plants appear to be equally sensitive to chronic toxicity. Copper sulfate and other copper compounds are effective algacides (free copper ions are the lethal agent). Single-cell and filamentous algae and cyanobacteria are particularly susceptible to the acute effects, which include reductions in photosynthesis and growth, loss of photosynthetic pigments, and mortality. Sensitive algae may be affected at low ppb concentrations of free copper in freshwater. Mammals are not as sensitive as aquatic organisms. The predominant mammalian effects include hepatic and renal toxicity, and fetal mortality.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from the Beal Mountain Mine, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

The FS goal for the site is to close the mine and allow the area to return to its pre-mining land uses. Although portions of the mine property were reclaimed, there are several on-going operational, maintenance, and reclamation requirements that need to be met for specific facilities before final closure is complete. There are also several significant and outstanding issues that potentially impact the environment that need to be addressed. These issues include the long-term geochemical reactivity of mine wastes (including both acidity and the release of

selenium to the environment from several potential mine sources), geotechnical stability of the pit high-wall and leach pad containment dike, public safety issues related to the pit high-wall, infiltration of precipitation and groundwater into the leach pad, treatment and disposal of heap leach solution, mitigation of impacts to surface water in German Gulch and other nearby drainages, and impacts to seeps and springs in the vicinity of the Beal Mountain Mine area.

Mine wastes present at the Beal Mountain Mine site are associated with certain mine facilities including: two reclaimed open pits; reclaimed ore crushing and processing facilities; a partially reclaimed waste rock dump; waste rock used in the construction of roads and leach pad containment dikes; a reclaimed heap leach pad; and, areas that have been impacted by LAD of mine solutions. In addition, there are water quality issues related to metals leaching from the waste rock dump and excess contaminated pad solution accumulation on the leach pad. Each of these facilities and issues were considered in the scope of the removal action in the EE/CA (Tetra Tech 2010). The implementation of the following proposed actions will occur in a phased approach, dependent upon available funding.

A. Proposed Actions

1. Proposed action description

The proposed actions are designed to mitigate the potential threat at the Beal Mountain Mine. The Proposed Actions for the Removal Action are non-time critical and consist of a combination of monitoring, institutional controls, removal or covering of waste and water treatment. Alternatives were developed for the following facilities and components of the site; Main Beal Mountain Pit, Waste Rock Dump, Leach Pad, Land Application Disposal (LAD) areas and water quality in German Gulch. An additional section discusses proposed actions that are common to all alternatives.

- a) **Main Beal Pit** - The proposed action for the Main Beal Pit is to continue the monitoring of the slide movement and water levels in the dewatering wells. The monitoring of the slide movement consists of measuring ground deformation from survey prisms and in inclinometers casings and by direct field observations. Water levels will be measured in the dewatering wells and the dewatering wells will be actively removing water from the slide area during the course of water treatment operations, which is generally seasonal from June through October. Another proposed action for the Main Beal Mountain pit is the placement of fences and signage to restrict public access to the pit high wall area and thereby address public safety concerns.
- b) **Waste Rock Dump** – The proposed action for the Waste Rock Dump is to continue monitoring of springs, seeps, groundwater and surface water quality looking for changes in pH, sulfate and metals concentrations that might indicate the onset of acid rock drainage and to monitor the impacts to surface water quality in German Gulch. Another proposed action for the Waste Rock Dump is to complete the implementation of the soil cover as per the original Mine's Closure Plan, which would consist of regrading an 18 acre portion of the upper waste rock dump and placing an soil cover over this portion of the dump, applying mulch and fertilizer and revegetating the area. This action is considered an

interim action and continued monitoring will assess the effectiveness of this response action in order to determine if the ultimate proposed action identified in the EE/CA is necessary. The ultimate proposed response action for the waste rock dump is the partial removal of waste rock from above SPR-10A, regrade the entire dump to slopes no steeper than 2.5:1, cover entire dump with a composite (geotextile/soil) cover system, install run-on and run-off controls and place soil borrow and revegetate the waste rock dump.

- c) **Leach Pad** - The proposed action for the Leach Pad is to continue monitoring of water levels in the pad, and monitoring of water quality in the leach pad, groundwater and leach pad under drain collection ponds. Another proposed action for the Leach Pad is to repair or replace a portion of the existing cover on the leach pad. The leach pad facility continues to accumulate water, particularly during spring runoff. Site investigation work has identified one probable pathway for water entering the facility along the northern edge of the leach pad. Investigation work continues to further identify any surface or groundwater pathways that are contributing to the accumulation of water in the heap. As these pathways are identified, engineering designs will develop solutions to eliminate the pathways. Likely remedial approaches, such as geotextile cover repair and/or grout walls, will be constructed at this site to eliminate or minimize the collection of excess water on the leach pad.. This approach is expected to be iterative for two reasons. First, in order to be able to assess the effectiveness of each constructed repair and secondly, due to the limited availability of funds.
- d) **Land Application Disposal** – The proposed action for the Land Application Disposal (LAD) area is to continue monitoring of the vegetation in the LAD cells and water quality in springs in the LAD area.
- e) **German Gulch** - The proposed action for German Gulch is to continue monitoring of springs, seeps and surface and groundwater quality. Another proposed action to continue the discharge of collected waste rock and main Beal Pit seepage to the Existing German Gulch Infiltration Gallery System. The waste rock toe drain seepage will continue to be mixed with the main Beal pit drain water and then diverted to an existing pipeline and discharged to infiltration galleries along German Gulch. This action would ultimately require the reconstruction/repair of this system to increase the flow capacity to a minimum of 400 gpm. We anticipate that three of the five existing drain fields (infiltration galleries) would be replace with new drain fields that would be constructed using the same general design and materials as the original drain fields. All pressure-reducing valves and flow meters would be replaced. As the system would operate by gravity, no power is required. At this time, no water treatment alternative is proposed for the waste rock dump seepage or German Gulch surface water quality alternatives.
- f) **Actions Common to All Alternatives** – The following proposed actions tend to be site-wide and would occur under all of the proposed actions described above. These actions are the construction of the Main Beal Pit surface water diversions, removal of all unnecessary facilities (buildings and foundations) and ponds, final reclamation of access roads, and removal of the storm water collection ponds.

2. Contribution to remedial performance

The proposed removal actions will not adversely affect, but will rather support and compliment any proposed future removal or remedial actions. Water in the leach pad will continue to be monitored and treated with the current RO system in order to manage the solution levels within the heap leach pad. Continued investigation of pathways contributing to the accumulation of water in the heap leach pad, will provide information necessary to design repair options for the heap. Continued monitoring at the other facilities will also provide additional information to be used in the design for the proposed actions to be implemented in the future. The implementation of the proposed actions is highly dependent on available funding. The Forest Service continues to use its limited funding and partner with others, such as Montana Department of Environmental Quality to complete priority work that will likely make a positive difference in contaminant exposure levels at the site.

3. Description of alternative technologies

Response actions potentially capable of achieving identified objectives and goals were screened in the EE/CA (Tetra Tech, 2010). These included monitoring, institutional controls, engineering source controls, engineering stability, in-situ soil treatment, and water treatment.

- a) **Monitoring** - Three types of monitoring are currently on-going at the Beal Mountain Mine site including surface water and groundwater monitoring, reclamation monitoring, and geotechnical stability monitoring. Surface water and groundwater monitoring down-gradient of mine facilities is being used to evaluate changes in conditions at the site and the effectiveness and success of response actions as measured by impacts to receiving waters. Reclamation monitoring evaluates the effectiveness of erosion control and revegetation on reclaimed mine facilities and is used to determine areas in need of maintenance. Geotechnical stability monitoring (using survey prisms, inclinometers, water well levels, and direct field observations) is being used to monitor movement of slides in the pit high-wall that potentially threaten the integrity of the southern leach pad containment dike. In addition to being used to evaluate success of response actions, the results of monitoring will be used to determine the need for other appropriate response actions.
- b) **Institutional Controls** - Institutional controls are used to restrict or control access to or use of a site. Land use and access restrictions are potentially applicable institutional controls. Land use restrictions would limit the possible future uses of the land through changes to the local forest management plan or implementation of a closure order. Institutional controls involve restricting access to the site via fencing and gates. Neither institutional controls nor land use controls achieve cleanup goals. However, in addition to limiting access, these controls can provide for long-term public safety.
- c) **Engineering Source Controls** – Engineering controls are used to reduce the mobility of contaminants by establishing barriers that limit contaminant exposure, reduce contaminant reactivity, and prevent or limit migration or flow of contaminated surface or groundwater. Engineering controls typically include containment, partial removal or relocation of wastes, capping, run-on/runoff controls, revegetation, and/or disposal. Engineering controls

generally do not reduce the volume or toxicity of hazardous materials.

- d) **Engineering Stability** - At the Beal Mountain Mine site, the clay/sill slide above the high-wall of the main Beal Mountain pit poses a potential risk to the structural integrity of the overlying south leach pad containment dike under worst-case conditions. Engineering alternatives examined for this site-specific issue include dewatering of the containment dike and underlying bedrock, and partial removal and relocation of spent ore on the pad.
- e) **In-Situ Soil Treatment** - A LAD area located to the north of the leach pad at the Beal Mountain Mine site was used extensively for discharge of treated pad solutions. As a result, soils may be contaminated with sulfate, cyanide, and metals or metalloids (selenium). Natural rinsing over time based on spring water quality monitoring results seems to be effective in reducing the concentration of contaminants reporting to adjacent surface and spring water. Without addition column leach testing, it is not certain if soil rinsing under either natural or artificial conditions can maintain surface water or groundwater quality standards with respect to contaminants of concern. The removal of the LAD equipment from the site has made an active soil rinsing alternative unattractive. However, effluent discharges to LAD systems from the existing RO treatment plant are currently being used to rinse previously impacted soils.
- f) **Water Treatment** - Two sources of water have been identified at the Beal Mountain Mine that may require treatment prior to discharge. The two sources are: (1) water accumulating in the heap leach pad; and (2) seepage waters collected from the waste rock pile and main Beal Pit. A reverse osmosis treatment system was selected for treatment of the pad solution and a full scale facility was constructed in 2008 for treatment of excess and actively accumulating pad solutions. Water infiltrating into the heap leach pad will require treatment and discharge either continuously or on a seasonal basis. The heap leach source would require treatment to meet the established groundwater effluent goals and RO treated water currently still exceeds surface water standards for cyanide and ammonium, and as result of this the water is currently disposed of through a LAD system rather than direct discharge to surface water.

Estimated average annual water flow for the waste rock source is 70 gallons per minute. Waste rock dump seepage consists of drainage collected from springs SPR-5A and SPR-10 plus seepage from the toe drain. The combined flow from these sources has been estimated to be approximately 70 gpm on an average annual basis, though the flow rate peaks at a higher rate (250 gpm) in the spring and decreases to a lower rate (eight gpm) through summer, fall, and winter. In 2002, flows from SPR-5A, SPR-10, and the toe drain were measured to be 11%, 6%, and 83% of the total flow, respectively (Jepson, 2002). These flow percentages likely vary seasonally, though data was not available to quantify the magnitude of seasonal variations. The waste rock water source would require treatment to meet the established groundwater effluent goals.

4. EE/CA

Tetra Tech, under contract to the Forest Service, prepared the final EE/CA that details site characteristics and identifies, develops, and evaluates alternatives. This undertaking was accomplished with substantial input from Forest Service specialists who analyzed the effects of the alternatives identified in the EE/CA and considered public comments. From this effort the Forest Service selected the preferred Removal Action alternative.

5. Applicable or relevant and appropriate requirements (ARARs)

This Removal Action will attain, to the extent practicable considering the exigencies of the situation, applicable or relevant and appropriate requirements (ARARs) of Federal and State laws. The identified ARARs are shown in Appendix A. The assessment of ARARs included review of the list of ARARs provided by the Montana Department of Environmental Quality.

Section 300.415(i) of the National Contingency Plan (NCP) and guidance issued by the Environmental Protection Agency (EPA) require that removal actions attain ARARs under federal or state environmental laws or facility siting laws, to the extent practicable considering the urgency of the situation and the scope of the removal (EPA, 1993). In addition to ARARs, the lead Agency may identify other federal or state advisories, criteria, or guidance to be considered for a particular release.

ARARs are either applicable or relevant and appropriate. Applicable requirements are those standards, requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, or contaminant found at a site and would apply in the absence of a CERCLA cleanup. Relevant and appropriate requirements are those standards, requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that are not applicable to a particular situation but apply to similar problems or situations, and therefore may be well suited requirements for a response action to address.

ARARs are divided into contaminant specific, location specific, and action specific requirements. Contaminant specific ARARs are listed according to specific media and govern the release to the environment of specific chemical compounds or materials possessing certain chemical or physical characteristics. Contaminant specific ARARs generally set health or risk based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment.

Location specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of cleanup activities because they are in specific locations. Location specific ARARs generally relate to the geographic location or physical characteristics or setting of the site, rather than to the nature of the site contaminants.

Action specific ARARs are usually technology or activity based requirements or limitations on

actions taken with respect to hazardous substances.

Only the substantive portions of the requirements are ARARs. Administrative requirements are not ARARs and do not apply to actions conducted entirely on-site. Provisions of statutes or regulations that contain general goals expressing legislative intent, but are non-binding, are not ARARs. In addition, in instances like the present case where the cleanup is proceeding in stages, a particular phase of the remedy may not comply with all ARARs, so long as the overall remedy does meet ARARs.

Under Section 121 of CERCLA, 42 U.S.C. §9621, only those state standards that are more stringent than any federal standard are considered to be an ARAR provided that these standards are identified by the state in a timely manner. To be an ARAR, a state standard must be "promulgated," which means that the standards are of general applicability and are legally enforceable. The State of Montana ARARs set forth below have been identified in cooperation with, and with assistance from, the State of Montana Department of Environmental Quality.

6. Project Schedule

Implementation of the proposed action will begin immediately following execution of this Action Memorandum. The actual schedule is highly dependent upon the funding available for the project. The proposed schedule assumes that base operational and maintenance funding and some additional funding for design and construction work will be available each year. The action common to all alternatives, annual site wide monitoring, main access road maintenance, leach pad water treatment, and operation of de-watering wells will occur in 2010. It is anticipated that these activities will be funded each year at the base level funding of approximately \$650,000. Each year additional design and construction work would occur at various mine facilities, with the level of action dependent upon the availability of funding. With a consistent funding source of \$2-3 million per year, it is anticipated that reclamation of the site would be completed in 10 to 15 years.

B. Estimated Costs

The following is an estimate of costs to be incurred in connection with the proposed CERCLA removal action (**Table 1**). The alternative cost column shows the total estimated cost of construction of \$39,530,139. Design costs are not included and assuming design costs are 5% of construction costs, \$2 million would be needed to cover design costs. The last column on **Table 1 – O&M Costs**, captures the annual cost of ongoing operations and maintenance (O&M) at the site, as well as three years of O&M for two proposed actions requiring ongoing O&M.

Table 1 presents the total cost of implementing the preferred alternative, by alternative. Costs shown in **Table 1** for monitoring alternatives (i.e., MB-1, WR-1) were calculated separately for each individual alternative. Two of the preferred alternatives also have annual O & M costs associated with their implementation. Alternative MB-2A –Public Safety Institutional Controls (fencing and signage) have annual O & M costs of \$6,510, and Alternative GG-3B – Discharge to Existing System have annual O & M costs of \$19,383. These O & M costs have been extended to a three-year period for each of these alternatives in **Table 1**.

Table 1 also presents cost to implement actions that are considered common to all alternatives. These common actions are: Main Beal pit high-wall surface water diversions, the removal of facilities (buildings and foundations), final road reclamation, facility pond removal, and select storm water collection pond removal.

Table 1 also presents Annual Site-Wide O & M Costs that includes: monitoring (such as water quality and geotechnical), road maintenance, leach pad water treatment, operation of de-watering wells, and annual cost for Forest Service management of the site. These activities need to be conducted and the costs incurred each year, even if no alternatives are selected for implementation.

Finally, the cost to conduct additional site characterization or more detailed engineering design work prior to implementation and construction of response alternatives is not included in these costs.

TABLE 1 PREFERRED ALTERNATIVE, COMMON ACTION AND ANNUAL SITE-WIDE MAINTENANCE COSTS			
Facility or Area	Preferred Alternative	Alternative Cost	O & M Costs
Main Beal Mountain Pit	MB-1 Monitoring	\$65,016	
	MB-2A- Fencing and Signage	\$31,984	\$19,530 3 Years O & M
	Main Beal Pit Total	\$97,000	\$19,530
Waste Rock Dump	WR-1 Monitoring	\$21,294	
	WR-2B Partial Removal with Complete Regrading and Composite Cover	\$14,373,728	
	Waste Rock Total	\$14,395,022	\$0
Leach Pad (implement alternatives sequentially LP-1, LP-5, LP-2, and LP-3 if required).	LP-1 Monitoring	\$39,963	
	LP-5 Grout Curtain North Edge of Leach Pad	\$4,257,806	
	LP-2 Replace Existing Cover	\$12,762,734	
	LP-3 Partial Removal of Spent Ore	\$7,132,911	
	Leach Pad Total	\$24,193,414	\$0
LAD Area	LAD-1 Monitoring	\$44,310	\$0
German Gulch	GG-1 Monitoring	\$30,870	
	GG-3B Existing System	\$214,648	\$ 58,149 3 years O & M
	German Gulch Total	\$245,518	\$58,149
Total Preferred Alternative Cost		\$38,975,264	\$77,679
Actions Common to All Alternatives	Main Beal Pit Surface Diversions	\$60,000	
	Remove Facilities & Ponds	\$270,625	
	Road (final reclamation)	\$200,250	
	Storm Water Collection Ponds	\$24,000	
Total Actions Common to All Alternatives		\$554,875	\$0
Annual Site-Wide O & M	Annual Site-Wide Monitoring		\$100,000
	Main Access Road Maintenance		\$20,000
	Leach Pad Water Treatment		\$300,000
	Operating De-watering Wells		\$15,000
	Forest Service Personnel		\$100,000
Total Annual Site Wide O & M Costs			\$535,000
Grand Totals		\$39,530,139	\$612,679

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Delayed action or no action will result in continued risks and threats to public health and the environment. The annual accumulation of solution on the leach pad, creates a situation that requires treatment and disposal of excess solution at a considerable cost to the government. The leach pad cover needs repair in order to substantially reduce the amount of water entering the leach pad. Other mine facilities require reclamation in order to alleviate the continued exposure to precipitation which generates infiltration that in-turn could result in changes in seepage chemistry, especially at the waste rock dump.

VII. OUTSTANDING POLICY ISSUES

None.

VIII. ENFORCEMENT

BMMI operated the Mine from 1988 to 1998. BMMI and the Mine were owned by Pegasus Gold Corporation. Pegasus went into bankruptcy in 1998. In 1999, the reclamation bond for the Site was released to the State. There are no current enforcement issues associated with the Site.

IX. RECOMMENDATION

This decision document presents the selected Removal Action for the Beal Mountain Mine within the Beaverhead-Deerlodge National Forest, Silver Bow County, Montana. The Removal Action has been developed in accordance with CERCLA, as amended, and is consistent with the NCP. This decision is based on the administrative record for the Beal Mountain Mine.

Conditions at the Beal Mountain Mine meet the NCP Section 300.415(b)(2) criteria for a Removal, and I recommend your approval of the proposed Removal Action:



Mary Beth Marks
On-Scene-Coordinator

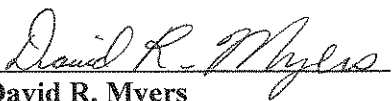
5-11-10
Date

I concur with the recommendation to implement the proposed action as described in this Action Memo for the Beal Mountain Mine:

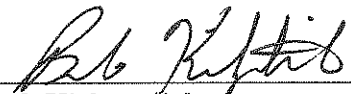


Janet L. Krivacek
District Ranger

5-13-10
Date

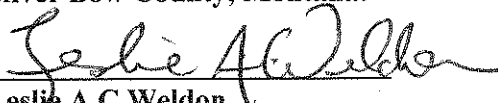

David R. Myers
Forest Supervisor
Beaverhead-Deerlodge National Forest

5/13/10
Date


Bob Kirkpatrick
Regional CERCLA Coordinator
USDA-FS Northern Regional Office

5/20/2010
Date

I approve of the proposed removal action as described in this Action Memorandum and referenced Engineering Evaluation/Cost Analysis for the Beal Mountain Mine, Silver Bow County, Montana:


Leslie A.C. Weldon
Region Forester

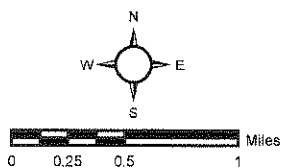
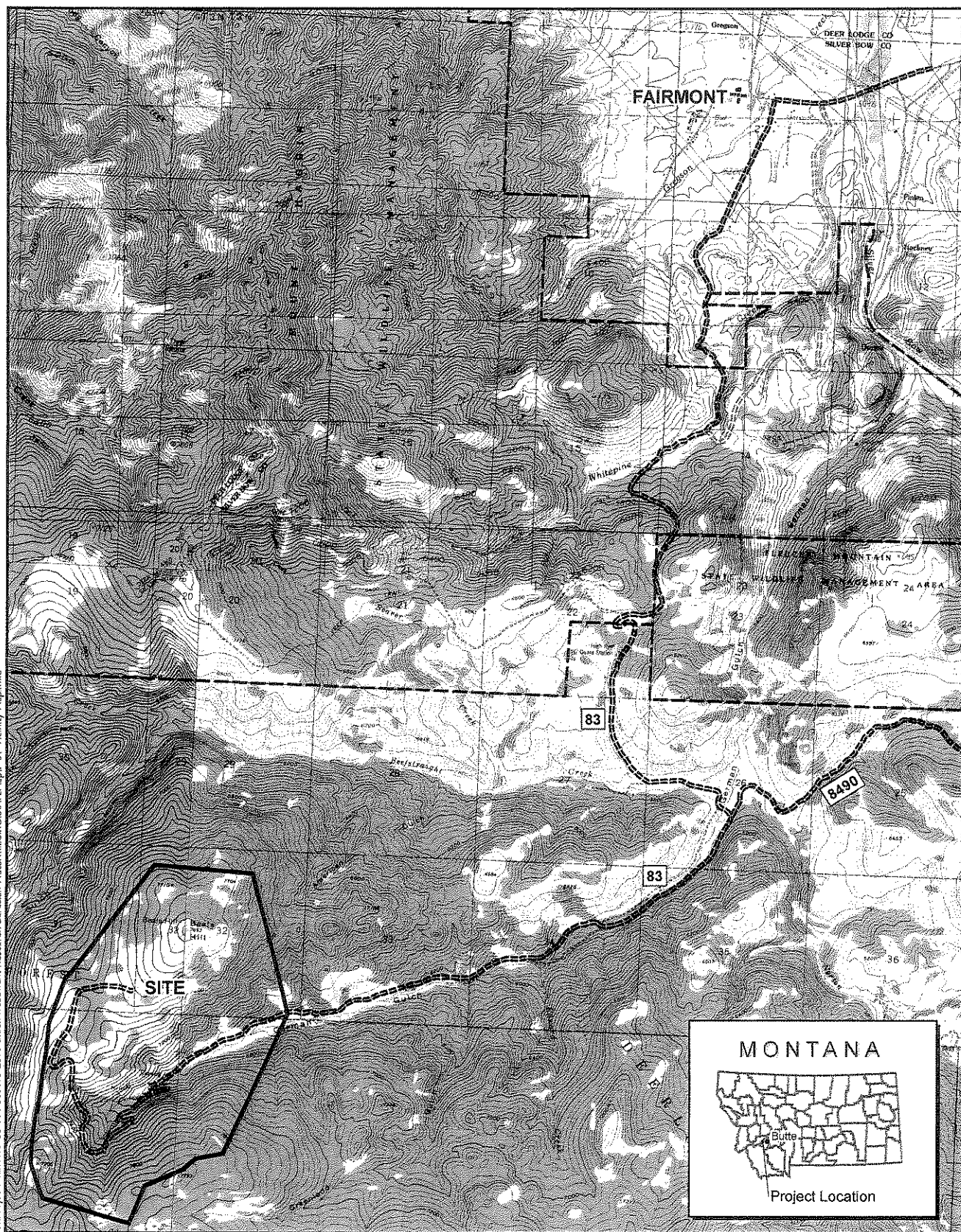
6/11/2010
Date

ATTACHMENTS:

Figure 1 - Vicinity Map
Figure 2 - Site Map

APPENDIX A – ARAR Table

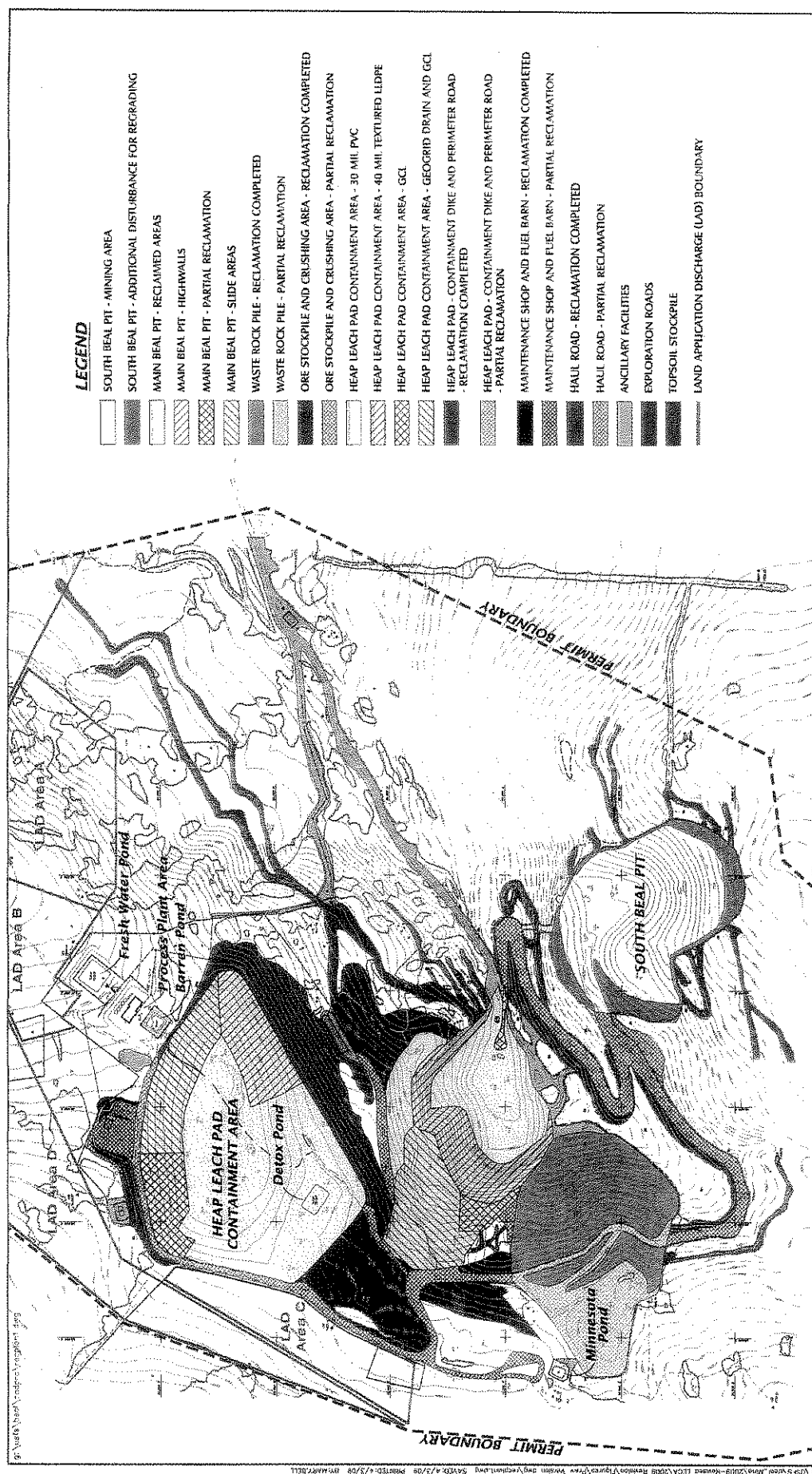
G:\Projects\Sanders Co\114-560175 2010 Block Treatment Research Eumstan Watershed\GIS\ArcMap\F-01-Vicinity Map.mxd



USGS 24K SERIES TOPOGRAPHIC MAP

- === Common Access Route
- === Leased Access Route
- === USFS Access Route
- 83 USFS Road Route Number

Vicinity Map
Beal Mountain Mine
Silver Bow County, Montana
FIGURE 1



Note: Facilities boundaries and status provided by Bruce Parker.

Beal Mountain Mine, December 2003
Topography from Horizons Aerial Photogrammetry, September 2003

Site Map
Beal Mountain Mine
Silver Bow County, Montana
FIGURE 3

FIGURE 3

APPENDIX A

Applicable or Relevant and Appropriate Requirements Table

APPENDIX A

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

Beal Mountain Mine Engineering Evaluation and Cost Analysis

APPENDIX A

Applicable or relevant and appropriate requirements (ARARs)

Any action at the Beal Mountain Mine Site will attain, to the extent practicable, considering the exigencies of the situation, applicable or relevant and appropriate requirements (ARARs) of federal and State laws. The identified ARARs are shown in the tables below. The assessment of ARARs included review of the list of ARAR's provided by the Montana Department of Environmental Quality.

Section 300.415(i) of the National Contingency Plan (NCP) and guidance issued by the EPA require that removal actions attain Applicable or Relevant and Appropriate Requirements (ARARs) under federal or state environmental laws or facility citing laws, to the extent practicable considering the urgency of the situation and the scope of the removal (EPA, 1993). In addition to ARARs, the lead Agency may identify other federal or state advisories, criteria, or guidance to be considered for a particular release.

ARARs are either applicable or relevant and appropriate. Applicable requirements are those standards, requirements, criteria, or limitations promulgated under federal or state environmental or facility citing laws that specifically address a hazardous substance, pollutant, or contaminant found at a site and would apply in the absence of a CERCLA cleanup. Relevant and appropriate requirements are those standards, requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that are not applicable to a particular situation but apply to similar problems or situations, and therefore may be well suited requirements for a response action to address.

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Action specific ARARs are usually technology or activity based requirements or limitations on actions taken with respect to hazardous substances.

Only the substantive portions of the requirements are ARARs. Administrative requirements are not ARARs and do not apply to actions conducted entirely on-site. Provisions of statutes or regulations that contain general goals expressing legislative intent but are non-binding are not ARARs. In addition, in instances like the present case where the cleanup is proceeding in stages, a particular phase of the remedy may not comply with all ARARs, so long as the overall remedy does meet ARARs.

Under Section 121 of CERCLA, 42 U.S.C. §9621, only those state standards that are more stringent than any federal standard are considered to be an ARAR provided that these standards are

identified by the state in a timely manner. To be an ARAR, a state standard must be "promulgated," which means that the standards are of general applicability and are legally enforceable. The State of Montana ARARs set forth below have been identified in cooperation with, and with assistance from, the State of Montana Department of Environmental Quality.

Appendix A Applicable or Relevant and Appropriate Requirements For Beal Mountain Mine			
Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
FEDERAL CONTAMINANT- SPECIFIC			
<u>Safe Drinking Water Act</u>			
National Primary Drinking Water Regulation	40 USC § 300 40 CFR Part 141	Establishes health-based standards (MCLs) for public water systems.	Not an ARAR. Defer to State Standards.
National Secondary Drinking Water Regulations	40 CFR Part 143	Establishes welfare-based standards (secondary MCLs) for public water systems.	Not an ARAR, not enforceable standards.
<u>Clean Water Act</u>			
Water Quality Standards	33 USC. §§ 1251- 1387 40 CFR Part 131 Quality Criteria for Water 1976, 1980, 1986	Ch. 26- Water Pollution Prevention & Control Sets criteria for water quality based on toxicity to aquatic organisms and human health.	Not an ARAR since the State has been delegated this program and has promulgated water quality standards for the designated beneficial uses.
<u>National Ambient Air Quality Standards</u>			
	40 CFR 50.6 (PM- 10)	Establishes standards for particulates with the air	Not an ARAR since only "major" sources are subject to requirements related to NAAQS
	40 CFR 50.12 (lead)	Establishes standards for emission of lead into the air	Not an ARAR, not a contaminant for the site.
FEDERAL LOCATION- SPECIFIC			
<u>National Historic Preservation Act</u>	16 USC § 470; 36 CFR Parts 63, 65 and 800; 40 CFR Part 6.310(b)	Requires Federal Agencies to take into account the effect of any Federally-assisted undertaking or licensing on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places and to minimize harm to any National Historic Landmark adversely or directly affected by an undertaking.	Applicable
<u>Archaeological and Historic Preservation Act</u>	16 USC § 469; 40 CFR ' 6.301(c)	Establishes procedures to provide for preservation of historical and archaeological data which might be destroyed through alteration of terrain as a result of a Federal construction project or a Federally licensed activity or program.	Applicable

Appendix A Applicable or Relevant and Appropriate Requirements For Beal Mountain Mine			
Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
<u>Historic Sites Act of 1935</u>	116 USC § 461; 40 CFR ' 6.310(a)	Requires Federal agencies to consider the existence and location of landmarks on the National Registry of Natural Landmarks to avoid undesirable impacts on such landmarks.	Applicable
<u>Protection and Enhancement of the Cultural Environment Order</u>	16 USC § 470	Directs federal agencies to institute procedures to ensure programs contribute to the preservation and enhancement of non-federally owned historic resources. Consultation with the Advisory Council on Historic Preservation is required if Reclamation activities should threaten cultural resources.	Applicable; however, no disturbance or loss of cultural environment will result from removal actions.
<u>Archaeological Resources Protection Act of 1979</u>	16 USC §§ 470aa 47011	Requires a permit for any excavation or removal of archeological resources from public lands or Indian lands. Substantive portions of this act may be relevant and appropriate if archeological resources are encountered during Reclamation activities.	Relevant and Appropriate
<u>American Indian Religious Freedom Act</u>	42 USC § 1996	This Act establishes a federal responsibility to protect and preserve the inherent right of American Indians to believe, express, and exercise the traditional religions of American Indians.	Applicable
<u>Native American Graves Protection and Repatriation Act</u>	25 USC § 3001	The Act prioritizes ownership or control over Native American cultural items, including human remains, funerary objects and sacred objects, excavated or discovered on Federal or tribal lands.	Applicable
<u>Protection of Wetlands Order</u>	40 CFR Part 6	Avoid adverse impacts to wetlands.	Substantial portions are applicable.
<u>Migratory Bird Treaty Act</u>	16 USC § 703 <u>et seq.</u>	Establishes a federal responsibility for the protection of international migratory bird resource.	Applicable
<u>Fish and Wildlife Coordination Act</u>	16 USC § 661 <u>et seq.</u> ; 40 CFR Part 6.302(g)	Requires consultation when Federal department or agency proposes or authorizes any modification of any stream or other water body and adequate provision for protection of fish and wildlife resources.	Applicable
<u>Floodplain Management Order</u>	40 CFR Part 6	Requires Federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid the adverse impacts associated with direct and indirect	Applicable

Appendix A Applicable or Relevant and Appropriate Requirements For Beal Mountain Mine			
Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
		development of a floodplain, to the extent possible.	
<u>Clean Water Act Section 404</u>	33 USC §§ 1251: 33CFR Part 330	Regulates discharge of dredged or fill materials into waters of the United States.	Substantial portions are applicable.
<u>Bald Eagle Protection Act</u>	16 USC §§ 668et seq.	Establishes a federal responsibility for protection of bald and golden eagles. Requires consultation with the USFWS.	Applicable
<u>Resource Conservation and Recovery Act</u>	40 CFR § 264.18 (a) and (b)	These regulations provide seismic and floodplain restrictions on the location of a waste management unit.	Relevant and Appropriate
<u>Endangered Species Act</u>	16 USC §§ 1531- 1543; 40 CFR Part 6.302(h); 50 CFR Part 402	Requires action to conserve endangered species within critical habitat upon which species depend. Includes consultation with Dept. of Interior.	Applicable
FEDERAL ACTION- SPECIFIC			
<u>Clean Water Act Point Source Discharge</u>	33 USC § 1342	Requires permits for the discharge of pollutants from any point source into waters of the United States.	Substantial portions are applicable
<u>Resource Conservation and Recovery Act (sub title C)</u>	42 USC Section 6921	Provisions regarding run-on and run-off controls	Relevant and Appropriate
<u>General Facility Standards</u>	40 CFR Part 264 Subpart F	Prescribes groundwater protection standards.	Not an ARAR. Actions at the site will consolidate or control mine waste, not create a RCRA TSD facility. Portions may be relevant but the state mine reclamation regulations, which provide specific guidelines, are therefore more appropriate
	40 CFR § 264.92, .93, and .94	Prescribes general groundwater monitoring requirements.	(See above)
	40 CFR § 264.97	Prescribes requirements for monitoring and detecting indicator parameters.	(See above)
	40 CFR § 264.98		(See above)

Appendix A
Applicable or Relevant and Appropriate Requirements
For Beal Mountain Mine

Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
Closure Requirements	40 CFR Part 264 Subpart F		
	40 CFR § 264.111	Provides that the owner or operator of a hazardous waste management facility must close the facility in a way that minimizes the need for further maintenance, and controls or eliminates the leaching or escape of hazardous waste or its constituents, leachate, or runoff to the extent necessary to protect human health and the environment.	Not an ARAR because mine waste is excluded under the Bevill Amendment. Portions may be relevant but the state mine reclamation regulations provide specific guidelines are therefore more appropriate.
	40 CFR § 264.117	Incorporates monitoring requirements	
	40 CFR § 264.310	Specifies requirements for caps, maintenance, and monitoring after closure.	(See above)
	40 CFR § 264.301	Prescribes design and operating requirements for landfills.	(See above)
	40 CFR § 264.301	Provides for a single liner and leachate collection and removal system.	(See above)
	40 CFR § 264.301(f)	Requires a run-on control system.	(See above)
	40 CFR § 264.301(g)	Requires a run-off management system	(See above)
	40 CFR § 264.301(h)	Requires prudent management of facilities for collection and holding of run-on and run-off.	(See above)
	40 CFR § 264.301(i)	Requires that wind dispersal of particulate matter be controlled.	(See above)
<u>Resource Conservation and Recovery Act (sub title D)</u>	40 CFR § 257	Establishes Criteria for Classification of Solid Waste Disposal Facilities and Practices. Reclamation will comply with the following requirements.	Not an ARAR. Actions at the site will consolidate or control mine waste, not create a RCRA TSD facility. Portions may be relevant but the state mine reclamation regulations, which provide specific guidelines, are therefore more appropriate Applicable.
	40 CFR § 257.3-1	Washout of solid waste in facilities in a floodplain posing a hazard to human life,	(See above)

Appendix A
Applicable or Relevant and Appropriate Requirements
For Beal Mountain Mine

Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
		wildlife, or land or water resources shall not occur.	
	40 CFR § 257.3-2	Facilities shall not contribute to the taking of endangered species or the endangering of critical habitat of endangered species.	(See above)
	40 CFR § 257.3-3	A facility shall not cause a discharge of pollutants, dredged or fill material, into waters of the United States in violation of Sections 402 and 404 of the Clean Water Act, as amended, and shall not cause non-point source pollution, in violation of applicable legal requirements implementing an area wide or statewide water quality management plan that has been approved by the Administrator under Section 208 of the Clean Water Act, as amended.	(See above)
	40 CFR § 257.3-4	A facility shall not contaminate an underground source of drinking water beyond the solid waste boundary or beyond an alternative boundary specified in accordance with this section.	(See above)
	40 CFR § 257.3-8(d)	Access to a facility shall be controlled so as to prevent exposure of the public to potential health and safety hazards at the site.	(See above)
<u>Surface Mining Control and Reclamation Act</u>	30 USC § 1201-1326	This Act and implementing regulations establish provisions designed to protect the environment from the effects of surface coal mining operations, and to a lesser extent non-coal mining. These requirements are relevant and appropriate to the covering of discrete areas of contamination. The regulations require that re-vegetation be used to stabilize soil covers over reclaimed areas. They also require that re-vegetation be done according to a plan which specifies schedules, species which are diverse and effective, planting methods, mulching techniques, irrigation if appropriate, and appropriate soil testing.	Not an ARAR since this is not a coal mine and there is a State program for mine reclamation. Will defer to State surface mining and reclamation regulations that are relevant and appropriate.

Appendix A Applicable or Relevant and Appropriate Requirements For Beal Mountain Mine			
Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
<u>Occupational Safety And Health Act</u>	29 CFR 1910 and 1926	Defines standards for employee protection during initial site characterization and analysis, monitoring activities, materials handling activities, training & ER.	Applicable
STATE CONTAMINANT- SPECIFIC			
<u>Montana Water Quality Act</u>	75-5-101 <u>et seq.</u> , MCA	Establishes Montana's laws to prevent, abate and control the pollution of state waters.	Applicable
	75-5-303, MCA	States that existing uses of state waters and the level of quality of state waters necessary to protect those uses must be maintained and protected.	Applicable
	75-5-605, MCA	Provides that it is unlawful to cause pollution of any state waters or to place or cause to be placed, any wastes where they will cause pollution of any state waters.	Applicable
	ARM 17.30.601 <u>et seq.</u>	Provides the water use classification for various streams and imposes specific water quality standards per classification.	Applicable
	<u>ARM 17.30.637</u>	Provides that surface waters must be free of substances attributable to industrial practices or other discharges that will: (a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines; (b) create floating debris, scum, a visible oil film or globules of grease or other floating materials; (c) produce odors, colors, or other conditions which create a nuisance or render undesirable tastes to fish or make fish inedible; (d) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; (e) create conditions which produce undesirable aquatic life.	Applicable
Regulations Establishing Ambient Surface Water Quality Standards	<u>ARM 17.30.705</u>	For all state waters, existing and anticipated uses and water quality necessary to support those uses must be	Applicable

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Applicable or Relevant and Appropriate Requirements
For Beal Mountain Mine

Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
		maintained and protected.	
Montana Groundwater Pollution Control System Regulations	ARM 17.30.1011	Applies non-degradation requirements to any activity which could cause a new or increased source of pollution to state water	Applicable
	ARM 17.30.1005	Explains the applicability and basis for the groundwater standards in ARM 17.30.1006, which establishes the maximum allowable changes in groundwater quality and may limit discharges to groundwater.	Applicable
	ARM 17.30.1006	Classifies groundwater into Classes I through IV based on the present and future most beneficial uses of the groundwater and states groundwater is to be classified to actual quality of actual use, whichever places the groundwater in a higher class.	Applicable
Montana Ambient Air Quality Regulations	ARM 17.8.206	Establishes sampling, data collection, and analytical requirements to ensure compliance with ambient air quality standards.	Applicable
	ARM 17.8.222	No person shall cause or contribute to concentrations of lead in the ambient air which exceed the following 90-day average: 1.5 micrograms per cubic meter of air.	Not an ARAR for this site

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Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
	ARM 17.8.220	No person shall cause or contribute to concentrations of particulate matter in the ambient air such that the mass of settled particulate matter exceeds the following 30-day average: 10 grams per square meter.	Applicable
	ARM 17.8.223	No person may cause or contribute to concentrations of PM-10 in the ambient air which exceed the following standards: 1) 24-hr. avg. : 150 micrograms per cubic meter of air, with no more than one expected exceedance per year; 2) Annual avg.: 50 micrograms per cubic meter of air.	Applicable
STATE LOCATION- SPECIFIC			

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For Beal Mountain Mine

Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
<u>Floodplain and Floodway Management</u>	76-5-401, MCA, ARM 36.15.601	Lists the uses permissible in a floodway and generally prohibits permanent structures, fill, or permanent storage of materials or equipment	Applicable
	76-5-403, MCA	Lists certain uses which are prohibited in a designated floodway, including any change that will cause water to be diverted from the established floodway, cause erosion, obstruct the natural flow of water, or reduce the carrying capacity of the floodway, or the concentration or permanent storage of an object subject to flotation or movement during flood level periods.	Applicable
	ARM 36.15.602	Specifies uses requiring permits for allowing obstructions in the floodway.	Applicable
	ARM 36.15.605	Identifies artificial obstructions and nonconforming uses that are prohibited within the designated floodway except as allowed by permit and includes "a structure or excavation that will cause water to be diverted from the established floodway, cause erosion, obstruct the natural flow of water, or reduce the carrying capacity of the floodway..." Solid waste disposal and storage of highly toxic, flammable, or explosive materials are also prohibited.	Applicable
	ARM 36.15.703	Describes allowed uses in the flood fringe. Prohibited uses within the flood fringe (i.e., areas in the floodplain, but outside of the designated floodway) areas include solid waste disposal and storage of highly toxic, flammable or explosive material.	Applicable

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Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
Floodplain Management Regulations	76-5-406, MCA; ARM 36.15.216	The factors to consider in determining whether a permit should be issued to establish or alter an artificial obstruction or nonconforming use in the floodplain or floodway are set forth in this section.	Applicable
	ARM 36.15.603	Proposed diversions or changes in place of diversions must be evaluated by the DNRC to determine whether they may significantly affect flood flows and, therefore, require a permit.	Substantial portions are applicable
	ARM 36.15.604	Prohibits new artificial obstructions or nonconforming uses that will increase the upstream elevation of the base flood 0.5 feet or significantly increase flood velocities.	Substantial portions are Relevant and Appropriate
<u>Floodplain Management Regulations (continued)</u>	ARM 36.15.606	Flood control works	Applicable
	ARM 36.15.701(3)(c)	Roads, Streets, highways, and rail lines (must be designed to minimize increase in flood heights).	Applicable
	ARM 36.15.701(3)(d)	Structures and facilities for liquid or solid waste treatment and disposal (must be flood-proofed to ensure that no pollutants enter flood waters and may be allowed and approved only in accordance with Montana Department of Environmental Quality (DEQ) regulations, which include certain additional prohibitions on such disposal).	Applicable
	ARM 36.15.702 (1)		
	ARM 36.15.702(2)	Residential structures	Not an ARAR
		Commercial or industrial structures	Not an ARAR

Appendix A Applicable or Relevant and Appropriate Requirements For Beal Mountain Mine			
Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
<u>Natural Streambed and Land Preservation Act</u>	75-7-101, MCA; ARM 36.2.401	Reclamation alters or affects a streambed or its banks. The adverse effects of any such action must be minimized	Applicable
	ARM 36.2.410	Establishes minimum standards if reclamation alters or affects a streambed, including any channel change, new diversion, riprap or other stream bank protection project, jetty, new dam or reservoir or other commercial, industrial or residential development.	Applicable
	87-5-502 and 504, MCA	A state agency or subdivision shall not construct, modify, operate, maintain or fail to maintain any construction project or hydraulic project which may or will obstruct, damage, diminish, destroy, change, modify, or vary the natural existing shape and form of any stream or its banks or tributaries in a manner that will adversely affect any fish or game habitat.	Applicable
<u>Montana Solid Waste Management Act and Regulations</u>	75-10-201, MCA; ARM 17.50.505	Specifies the requirements that apply to the location of any solid waste management facility.	Applicable
	75-10-212, MCA	Prohibits dumping or leaving any debris or refuse upon or within 200 yards of any highway, road, street, or alley of the State or other public property, or on privately owned property where hunting, fishing, or other recreation is permitted.	Applicable
<u>Endangered Species</u>	87-5-106, 107, 111, MCA ARM 12.5.201	Fish and wildlife resources are to be protected and no construction project or hydraulic project shall adversely affect game or fish habitat.	Applicable

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Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
<u>Montana Antiques Act</u>	22-3-421, MCA	The Montana Antiquities Act addresses the responsibilities of State agencies regarding historic and prehistoric sites including buildings, structures, paleontological sites, archaeological sites on state owned lands. Each State agency is responsible for establishing rules regarding historic resources under their jurisdiction which address National Register eligibility, appropriate permitting procedures and other historic preservation goals. The State Historic Preservation Office maintains information related to the responsibilities of State Agencies under the Antiquities Act.	Relevant and Appropriate
<u>Montana Human Skeletal Remains and Burial Site Protection Act</u>	22-3-801, MCA	The Human Skeletal Remains and Burial Site Protection Act is the result of years of work by Montana Tribes, State agencies and organizations interested in ensuring that all graves within the State of Montana are adequately protected. If human skeletal remains or burial sites are encountered during Reclamation, then requirements will be applicable.	Applicable
STATE ACTION SPECIFIC			
<u>Montana Water Quality</u>	75-5-605, MCA	Pursuant to this section, it is unlawful among other things, to cause pollution of any state waters, to place any wastes in a location where they are likely to cause pollution of any state waters, to violate any permit provision, to violate any provision of the Montana Water Quality Act, to construct, modify, or operate a system for disposing of waste (including sediment, solid waste and other substances that may pollute state waters) which discharge into any state waters without a permit or discharge waste into any state waters.	Applicable
MPDES Permit Requirements	ARM17.30.1342-1344	Sets forth the substantive requirements applicable to all MPDES and NPDES permits. Includes the requirement to properly operate and maintain all facilities and systems of treatment and control.	Substantial portions are applicable

Appendix A Applicable or Relevant and Appropriate Requirements For Beal Mountain Mine			
Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
	ARM 17.30.1203 and 1344	Technology-based treatment for MPDES permits.	Substantial portions are applicable.
Non-degradation of Water Quality	75-5-303, MCA	States that existing uses of state waters and the level of water quality necessary to protect the uses must be maintained and protected. Provides exemption that allows changes of existing water quality resulting from emergency or remedial activity designed to protect the public health or the environment.	Substantial portions are applicable.
	ARM 17.30.637	Prohibits discharges containing substances that will: (a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines; (b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials; (c) produce odors, colors or other conditions which create a nuisance or render undesirable tastes to fish flesh or make fish inedible; (d) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; or (e) create conditions which produce undesirable aquatic life.	Applicable
	ARM 17.30.705	Provides that for any surface water, existing and anticipated uses and the water quality necessary to protect these uses must be maintained and protected unless degradation is allowed.	Applicable
	ARM 17.24.633	All surface drainage from a disturbed area must be treated by the best technology currently available.	Applicable
Stormwater Runoff	ARM 17.30.1341	DEQ has issued general storm water permits for certain activities. The substantive requirements of the following permits are applicable for the following activities: for construction activities, for mining activities, Oil and Gas, and for industrial	Applicable

Appendix A Applicable or Relevant and Appropriate Requirements For Beal Mountain Mine			
Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
<u>Clean Air Act Of Montana</u>	75-2-101, MCA	Montana's policy is to achieve and maintain such levels of air quality as will protect human health and safety and, to the greatest degree practicable, prevent injury to plant and animal life and property.	Applicable
Air Quality Requirements	ARM 17.8.308	No person shall cause or authorize the production, handling, transportation or storage of any material unless reasonable precautions to control emissions of airborne particulate matter are taken.	Applicable
	ARM 17.8.604	Lists certain wastes that may not be disposed of by open burning.	Not an ARAR for this Site
	ARM 17.8.1401-1404	Sets forth emission standards for hazardous air pollutants	Not an ARAR for this Site
<u>Montana Solid Waste Management Act</u>	75-10-201, et seq. MCA	Public policy is to control solid waste management systems to protect the public health and safety and to conserve natural resources whenever possible.	Not an ARAR. Any removal action will not create a solid waste facility
Solid Waste Management Regulations	ARM 17.50.505 (1) and (2)	Sets forth standards for all solid waste disposal sites	Applicable
	ARM 17.50.506	Specifies design requirements for landfills. Landfills must either be designed to ensure that MCLs are not exceeded or the landfill must contain a composite liner and leachate collection system which comply with specified criteria.	Substantial portions are relevant and appropriate
	ARM 17.50.511	Sets forth operational and maintenance and design requirements for solid waste management facilities using land filling methods.	Relevant and Appropriate
	ARM 17.50.523	Specifies that solid waste must be transported in such a manner as to prevent its discharge, dumping, spilling or leaking from the transport vehicle.	Relevant and Appropriate
	ARM 17.50.530	Sets forth the closure requirements for landfills.	Portions maybe relevant and appropriate
	ARM 17.50.531	Sets forth post-closure care requirements for Class II landfills.	Portions maybe relevant and appropriate
		Allows variances to be granted from solid	

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Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
	75-10-206, MCA	waste regulations if failure to comply with the rules does not result in a danger to public health or safety or compliance with specific rules would produce hardship without producing benefits to the health and safety of the public that outweigh the hardship.	Portions maybe relevant and appropriate
<u>Montana Strip and Underground Mine Reclamation Act</u>	82-4-201, MCA; 82-4-301		
	82-4-231, MCA	Sets forth objectives that require the operator to prepare and carry out a method of operations plan to reclaim and revegetate the land affected by this operation	Relevant and Appropriate
	82-4-233, MCA	Requires that after the operation has been backfilled, graded, top soiled and approved, the operator shall establish a vegetative cover on all impacted lands.	Relevant and Appropriate
	82-4-336, MCA	Disturbed areas must be reclaimed to utility and stability comparable to adjacent areas.	Relevant and Appropriate
	ARM 17.24.501	Provides general backfilling and grading requirements.	Relevant and Appropriate
<u>Montana Strip and Underground Mine Reclamation Act (Contd)</u>	ARM 17.24.519	Requires monitoring of settling of regraded areas.	Relevant and Appropriate
<u>Montana Strip and Underground Mine Reclamation Act (Hydrology Requirements)</u>	ARM 17.24.631	Reclamation operations must be planned and conducted to minimize disturbance and prevent damage to the prevailing hydrologic balance.	Relevant and Appropriate
	ARM 17.24.633	Specifies that sediment controls must be maintained until the disturbed area has been restored and revegetated.	Relevant and Appropriate
	ARM 17.24.634	Drainage design shall emphasize premining channel and floodplain configurations that blend with the undisturbed drainage system above and below; will meander naturally; remain in dynamic equilibrium with the system; improve unstable premining conditions, provide for floods, provide for long term stability of the landscape; and establish a	Relevant and Appropriate

Appendix A Applicable or Relevant and Appropriate Requirements For Beal Mountain Mine			
Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
		premining diversity of aquatic habitats and riparian vegetation.	
	ARM 17.24.635-637	Sets forth requirements for temporary and permanent diversions.	Relevant and Appropriate
	ARM 17.24.638	Sediment control measures must be implemented during operations.	Relevant and Appropriate
	ARM 17.24.641	Sets methods for preventing drainage from acid-and toxic-forming wastes into ground and surface waters.	Relevant and Appropriate
	ARM 17.24.639	Sets forth requirements for construction and maintenance of sedimentation ponds.	Relevant and Appropriate
	ARM 17.24.640	Discharges from sedimentation ponds, permanent and temporary impoundments, must be controlled to reduce erosion and enlargement of stream channels, and to minimize disturbance of the hydrologic balance.	Relevant and Appropriate
<u>Montana Strip and Underground Mine Reclamation Act</u> (Hydrology Requirements)-Contd	ARM 17.24.641	Establishes practices to avoid drainage from acid or toxic forming spoil material into ground and surface water.	Relevant and Appropriate
	ARM 17.24.643 through 17.24.646	Provisions for groundwater protection, groundwater recharge protection, and groundwater and surface water monitoring.	Relevant and Appropriate
<u>Montana Strip and Underground Mine Reclamation Act</u> (Top Soiling, Re-vegetation, and Protection of Wildlife and Air Resource Regulations)	ARM 17.24.701 and 702	Requirements for redistributing and stockpiling of soil for reclamation.	Relevant and Appropriate
	ARM 17.24.703	Materials other than, or along with, soil for final surfacing of spoils or other disturbances must be capable of supporting the approved vegetation and post-mining land use.	Relevant and Appropriate
	ARM 17.24.711	Requires that a diverse, effective, and permanent vegetative cover of the same seasonal variety native to the area of land to be affected shall be established except	Relevant and Appropriate

Appendix A Applicable or Relevant and Appropriate Requirements For Beal Mountain Mine			
Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
		on road surfaces and below the low-water line of permanent impoundments.	
	ARM 17.24.713	Specifies that seeding and planting of disturbed areas must be conducted during the first appropriate period for favorable planting after final seedbed preparation; but not longer than 90 days after top soil placement.	Relevant and Appropriate
	ARM 17.24.714	According to this section, as soon as practical, a mulch or cover crop must be used on all regraded and resoiled areas to control erosion, to promote germination of seeds, and to increase moisture retention of soil until permanent cover is established.	Relevant and Appropriate
	ARM 17.24.716	Establishes methods of revegetation.	Relevant and Appropriate
<u>Montana Strip and Underground Mine Reclamation Act</u> (Top Soiling, Revegetation, and Protection of Wildlife and Air Resource Regulations) – Contd-	ARM 17.24.717	Relates to the planting of trees and other woody species if necessary.	Relevant and Appropriate
	ARM 17.24.718	Soil amendments must be used as necessary to aid in the establishment of permanent vegetation; irrigation, management, fencing, or other measures may also be used after review and approval by the dep't.	Relevant and Appropriate
	ARM 17.24.721	Specifies that rills or gullies in reclaimed areas must be filled, graded or otherwise stabilized. .	Relevant and Appropriate
	ARM 17.24.723	States that operators shall conduct approved periodic measurements of vegetation, soils, water, and wildlife, and if data indicate that corrective measures are necessary, shall propose such measures.	Relevant and Appropriate
	ARM 17.24.724	States that operators shall conduct approved periodic measurements of vegetation, soils, water, and wildlife, and if data indicate that corrective measures are necessary, shall propose such measures.	Relevant and Appropriate
	ARM 17.24.726	Requires standard and consistent field and laboratory methods to obtain and evaluate revegetated area data with reference area	Relevant and Appropriate

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Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
	ARM 17.24.731	data and/or technical standards If toxicity to plants or animals on the revegetated area or the reference area is suspected due to the effects of the disturbance, comparative chemical analyses may be required.	Relevant and Appropriate
	ARM 17.24.751	Sets forth requirements to protect and enhance fish and wildlife habitat.	Relevant and Appropriate
	ARM 17.24.824	If land use is to be other than grazing land or fish and wildlife habitat, areas of land affected by mining must be restored in a timely manner to higher or better uses achievable under criteria and procedures set forth.	Relevant and Appropriate
<u>Ambient Air Quality Regulations</u>	ARM 17.8.308(1), (2), and (3)	Airborne particulate matter. There shall be no production, handling, transportation, or storage of any material, use of any street, road, or parking lot, or operation of a construction site or demolition project unless reasonable precautions are taken to control emissions of airborne particles.	Applicable
	ARM 17.8.304(2)	Airborne particulate matter. There shall be no production, handling, transportation, or storage of any material, use of any street, road, or parking lot, or operation of a construction site or demolition project unless reasonable precautions are taken to control emissions of airborne particles.	Applicable
	ARM 17.8.604	Lists certain wastes that may not be disposed by open burning, including oil or petroleum products, RCRA hazardous wastes, chemicals, and treated lumbers.	Not an ARAR due to no burning occurring for any action
	ARM 17.24.761	Specifies a range of measures for controlling fugitive dust emissions during mining and reclamation activities	Applicable
<u>Noxious Weeds</u>	7-22-2101(B)(a), MCA	Defines "noxious weeds" as any exotic plant species established or that may be introduced in the state which may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses or that may harm native plant communities and that is designated: (I) as a statewide	Applicable

Appendix A Applicable or Relevant and Appropriate Requirements For Beal Mountain Mine			
Standard, Requirement Criteria Or Limitation	Citation	Description	ARAR Status
		noxious weed by rule of the department; or (ii) as a district noxious weed by a board, following public notice of intent and a public hearing. Designated noxious weeds are listed in ARM 4.5.201 through 4.5.204 and must be managed consistent with weed management criteria developed under Section 7-22-2109(2)(b), MCA.	
Montana Safety Act	Sections 50-71-201, 202 and 203, MCA	State that every employer must provide and maintain a safe place of employment, provide and require use of safety devices and safeguards, and ensure that operations and processes are reasonably adequate to render the place of employment safe.	Applicable

TO BE CONSIDERED (TBC) DOCUMENTS

A list of TBC documents is included in the Preamble to the NCP, 55 Fed. Reg. 8765 (March 8, 1990). Those documents, plus any additional similar or related documents issued since that time, should be considered during the conduct of the Reclamation design and construction. Other documents include:

U. S. EPA Ambient Water Quality Criteria for Cyanide-1984- Outlines various species of Cyanide and impacts to aquatic communities.

USDA-FS FSM 7500-Water Storage and Transmission- Under Section 7524 (General Design Standards) of Chapter 7520 (Dam Planning, Investigation, and Design guidance is given for the design of dams and retaining structures which can be adapted for elements at this Site

Nevada Mining Regulations NAC 445A.383 and 445A.430- Which deals with the issues WAD cyanide and the stabilization of spent ores.